

APPENDIX IV. ANALYTICAL METHODS, 2001 NATIONAL RESIDUE PROGRAM

INTRODUCTION

The Food Safety and Inspection Service (FSIS) requires analytical methods for detecting, quantifying, and identifying residues that may be present in meat, poultry, and processed egg products. These methods can be used by the Agency for monitoring and surveillance activities to determine whether a product is adulterated and for human risk assessment evaluations. The Agency uses available methodology to take appropriate regulatory action against adulterated products, consistent with the reliability of the analytical data. This section describes the types of methods used by FSIS to conduct analyses.

KEY TO ABBREVIATIONS

APCI -- Atmospheric Pressure Chemical Ionization

Confirm -- Confirmatory Method

Determ. -- Determinative Method

ECD -- Electron Capture Detector

ELISA -- Enzyme-Linked Immuno Sorbent Assay

GC -- Gas Chromatograph

GPC -- Gel Permeation Chromatography

HPLC -- High Performance Liquid Chromatography

Method Detection Limit -- The lowest amount of individual residue or sample component that can be reliably observed or found in the sample matrix by the current appropriate analytical methodology.

MS -- Mass Spectrometry

NA -- Not Applicable

ppb -- Parts per billion

ppm -- Parts per million

SIM -- Selected-Ion Monitoring Mode

TBD -- To Be Determined

Compound Class	Compound	Method Type	Methodology	Method Detection Limit
Antibiotics	Carbadox	Determ.	GC-ECD	7.5 ppb
		Confirm.	GC-MS-SIM	NA
	Chloramphenicol	Determ.	GC	0.25 ppb
		Confirm.	GC-MS	0.5 ppb
	Florfenicol	Confirm.	GC-MS	1.9 ppm
	<u>Floroquinolones:</u>			
	Enrofloxacin	Determ.	HPLC	25 ppb
	Ciprofloxacin			50 ppb
	Desethylene ciprofloxacin			12.5 ppb
	Sarafloxacin			50 ppb
	Danofloxacin			50 ppb
	Difloxacin			50 ppb
	Marbofloxacin			50 ppb
	Orbifloxacin			25 ppb
	Tilmicosin	Determ.	HPLC- Ion Pairing	Muscle 300 ppb Liver and Kidney 600 ppb
		Confirm.	APCI-LC-MS	0.05 ppm
	<u>Antibiotics in FSIS Bioassay Method:</u>			
	Penicillin	Determ.	7-plate microbiological inhibition assay	0.01 ppm
	Chlortetracycline			0.01 ppm
	Tetracycline or Oxytetracycline			0.08 ppm
	Streptomycin			0.1 ppm
	Neomycin			0.25 ppm
	Erythromycin			0.05 ppm
	Gentamicin			0.15 ppm
	Ampicillin			0.01 ppm
	Novobiocin			0.25 ppm
	Spectinomycin			10 ppm
	Tylosin			0.2 ppm
Arsenicals	Arsenicals	Determ.	Atomic Absorption Spectrophotometry	
Avermectins	Ivermectin Doramectin Moxidectin	Determ.	HPLC	2.0 ppb
		Confirm.	APCI-LC-MS	25 ppb
Beta Agonists	Ractopamine	Determ.	HPLC	
		Confirm.	LC/MS	25ppb
	Clenbuterol	Screen	ELISA	TBD
		Confirm.	LC-MS-MS	

Compound Class	Compound	Method Type	Methodology	Method Detection Limit
	<u>Organohalides:</u> HCB Alpha BHC Lindane Heptachlor Aldrin Ronnel Linuron Oxychlordane Chlorpyrifos Nonachlor Heptachlor epoxide Endosulfan I Trans-chlordanne Cis-chlordanne Chlorfenvinphos Dieldrin P, p'-DDE Captan Stirofos Kepone Endrin P, p'-TDE O, p'-DDT Endosulfan II P, p'-DDT Carbophenothion Mirex Methoxychlor Phosalone Coumaphos-O Coumaphos-S Toxaphene CB 1242 PCB 1248 PCB1254 PCB 1260	Determ.	GPC with GC-ECD	0.01 ppm 0.01 ppm 0.01 ppm 0.01 ppm 0.02 ppm 0.02 ppm 0.25 ppm 0.02 ppm 0.05 ppm 0.03 ppm 0.01 ppm 0.01 ppm 0.10 ppm 0.10 ppm 0.03 ppm 0.01 ppm 0.02 ppm 0.02 ppm 0.05 ppm 0.03 ppm 0.01 ppm 0.01 ppm 0.04 ppm 0.02 ppm 0.03 ppm 0.03 ppm 0.03 ppm 0.04 ppm 0.15 ppm 0.01 ppm 0.15 ppm 0.15 ppm 0.50 ppm 0.30 ppm 0.30 ppm 0.30 ppm 0.30 ppm
		Confirm.	GC-MS	NA
Hormones, synthetic	DES/Zeranol	Determ. & Confirm.	GC-MS	0.5 ppb
Nonsteroidal Anti-inflammatory Drugs (NSAID's)	Phenylbutazone	Determ.	GPC with GC-ECD	TBD
Steroids	Melengesterol Acetate (MGA)	Confirm.	GC-MS	TBD
		Determ.	GC	5 ppb
		Confirm.		NA

Compound Class	Compound	Method Type	Methodology	Method Detection Limit
Sulfonamides	Sulfapyridine Sulfadiazine Sulfathiazole Sulfamerazine Sulfamethazine Sulfachloropyridazine Sulfamethoxypryridazine Sulfaquinoxaline Sulfadimethoxine Sulfaethoxypyridazine Sulfaphenazole Sulfatroxazole Sulfisoxazole Sulfadoxine	Determ.	TLC	0.05 ppm
		Confirm.	GC-MS	NA